Digital technologies to study theory, history and criticism of architecture at the School of Architecture at Madrid Polytechnic University

The search for some guides to direct the 'inquiry learning'

Lilia Maure

Professor ETS Arquitectura, Universidad Politécnica Madrid (SPAIN)
liliamaure@gmail.com, lilia.maure.rubio@upm.es

Abstract

Objectives: The object of this presentation is to emphasize the need, in web classroom application digital learning to define an appropriate method that focus the digital inquiry on drafting a guidelines set. In this paper I want to underline the utility of general and specific guidelines to pilot the student digital learning in 'history of architecture' at Madrid University.

*(The Power Point presents the result of a specific search on 'central plan' in History of Architecture training. I wanted the students to find out the difference between a baroque central plan church -San Ivo alla Sapienza at Rome- and a 20th century reinforced concrete central hall - Centennial Hall in Wroclaw -**Vrotsuav**-. The guides must direct to the specific knowledge I hope the students to achieve)*

The task was to explore and develop the potentiality of the ICT (Information and Communication Technology) to get a web-based education method (WBE) able to challenge the traditional education.

Conclusions: The implementation of ICT in History of Architecture training for nearly a decade led me to conclude first, that an organized digital inquiry was the only effective method for a proper web-based education; second, that the web classroom application of the digital technologies is the main process nowadays to guarantee the appropriate training, and third, that the organized research requires of some guides to lead the development.

Method and guidelines in digital learning: The ICT in Higher Education

ICT is defined firstly, as the set of tools related to the acquisition, transmission, processing and storage of digitized information, and secondly, as the whole of products and processes derived from the digital tools (hardware and software) applied to education -videoconference, chat, web pages, multimedia tutorials-.

On the other hand, we understand by Information, the acquisition of knowledge that expands or clarify our understanding about a particular subject. The use of ICT is concerned thereby with the right application of the digital tools and the proper definition of the information we seek.

There are five main reasons to promote the use of ICT in higher education:

1. The Education Institutions have failed to take account of the ICT revolution, ignoring the ability of young people in using digital technologies
2. The implementation of the EHEA -European Higher Education Area- brings about methodological changes, based on ICT, to foster an efficiency university education system
3. The new Digital Agenda for Europe 2015 -according to the European Parliament resolution of 5 May 2010- recommends the introduction of the 'digital competence' concept in the education system, involving both, teachers and students
4. The usefulness of ICT to store information
5. The recognition of the IT -Information Technology- as a proper information system to study and research.

The use of ICT forces as to clarify first which are the students technological skills and which the teacher's ones.

Teachers must get basic technology knowledge concerning:

1. Use of the OS -Operating System-; software and hardware installation and maintenance

2. Basic computer applications: Word processing, Databases
3. Presentations and multimedia applications: documentary bases, audiovisual and multimedia presentations
4. Educational software
5. Internet: meaning, information, communication, edition and transferring results
6. Classroom organization -concerning resources and material and
7. Digital evaluation.

Teachers and students must share a right knowledge or use of:

1. Generic technological skills -computer and communication resources and programs-
2. Specific technological skills -Virtual Campus, GATE platforms, etc.- and
3. Digital edition skills, associates with: presentations -2D, 3D-; page edition -MS Frint Page, Adobe Dreamweaver-; and image processing applications -Photoshop, Adobe Flash vector dynamics-.

The main purpose for education, concerning ICT, is regarded with the teaching skills: 1. Ability to integrate technology resources into the regular educational activities and, 2. Capacity to define the proper guidelines for the acquisition, transmission, processing and storage of digitized information.

Actually, the difficulty for digital education does not lie in the use of digital tools but in which learning tools must be used and what for, and how to establish the guidelines that conduct the enquiry research: which hardware and software products do we have to select in order to guarantee the desire outcomes.

Once the technological skills- technological resources and their integration in the classroom- are established as suitable, we have to set up, as part of the teaching skills, the method and guidelines to conduct the digital training to obtain a qualified information.

Method and guidelines in digital learning: **The Inquiry Based Learning IBL in History of architecture**

There are two ways, used from the 1990s, to apply the ICT in education, the **CSCL** -Computer Supported Collaborative Learning- and the **IBL** -Inquiry based Learning-, being IBL the one we consider suitable for Higher Education.

The IBL fosters the teacher to define an effective proposal to optimize the results, obliging them to focus the digital education through:

1. State precisely the objectives and criteria of the research, according to the target achieved
2. Define the pursuit results
3. Select the exploration tools and the information management,
4. Divert to the resources and educational content repositories –web pages, databases...–,
5. Delineate the goals and appropriate software to process the information results –2D + 3D–,
6. Outline the evaluation and self-evaluation systems, and
7. Facilitate the storage and transmission of results.

The general and specific guidelines in digital learning constitute the elemental device to settle the digital education based on IBL; it is therefore a top priority to define them general guidelines –according to the analytical study of architecture– and the specific ones –according to the historical, theoretical, and critical study of architecture–.

The guidelines must lead the student management search, in surfing the web - supported by the advisory teacher-, so that he can achieve, by inquiring, the training that could receive in a traditional way. They must be organized according to:

1. Acquisition of information -critical approach search and selection
2. Transmission and processing of information -analysis and synthesis of information on a creative sense

3. Definition of the objectives and the tools to prevail in the processing of information
4. Digital publication and storage of information -2D/3D- on artistic and technological training
5. Transfer of the acquired knowledge, creating a repository of information that allows teachers and students to share the resources.

Guidelines in computer-aided inquiry based learning in historical and analytical study of architecture

The purpose of drafting guidelines on the application of ICT (information and communication technology), is to make the most of the inquiry process -acquisition, transmission, processing and storing digitized information- on Architecture learning. On the other hand, guidelines are to promote the student skill, his critical sense and creativity.

The traditional method in History of Architecture learning is integrated by:

1. A set out of historical, biographical, cultural, artistic and urban data, enclosed by a state of ideas that outline the theoretical basis of architecture
2. The use of photographic projection of architecture works, its documents, drawings and models.

The goal is to study and understand the theoretical basis and to figure out the formal and stylistic principles of architecture, its construction, its ornaments, finishing materials, and natural lighting.

The presentation is followed by a student research concerning:

1. Texts, articles, and essays reading
2. Analytical studies of the different piece of architecture works selected in the program, and
3. The set up of conclusions about the architecture studied.

Educational innovation inquiry guides

The educational innovation at university, concerning the web-classroom application, must be initially complemented by traditional presentations that introduce the main lines of the subject to study. The inquiry guidelines must be in relation to the different subjects of study. There must not be unique inquiry guides to lead the research of a certain teaching material, but general and specific ones.

As we said previously, the Power Point shows a specific study on 'central plan' buildings in History of Architecture training, in order to foster the acquisition, transmission, processing and storage of digitized information. It is the development of the proper guide defining the research objectives, the inquiry features (tags), and the suitable software. Guides should be schematic and accurate.

Specific guidelines for a 'central plan architecture' inquiry at the application of ICT:

Definition of the building by 2D and 3D representation based on:

a. Digital inquiring:
   - Historical data- building name, authorship, location, date of construction, functional type, composition type, construction system, materials, lighting, finishes, style- that context the architectural work.
   - Graphic data -drawings, plans, models and photos-that allow us to a graphical analysis of the work
   - Architecture geographic information -Google Earth/Maps Bing-

b. Analitical study:
   - Spacial analysis: construction-space relationship
   - Structural/construction analysis Detection of:
     - Structural/construction elements
     - Construction types: columns, pillars, walls, arches, domes

        - Structural elements
    - Linguistic systems analysis. Detection of:
        - Modular elements
        - Linguistic elements
    - Material analysis: shape and properties
        - Construction
        - Finish
        - flooring
    - Lighting analysis

c. Information processing:
    - Descriptive approach -2D&3D-
    - Analytic study -2D&3D-

d. Resources

Postcript:

To conclude I want to emphasize how essential is to foster university teachers to an education training based on the ICT. This way we can create a system able to motivate students to study and research, selecting the information, promoting critical thinking, analyzing and synthesizing the selected information, developing creativeness, and defining the acquired knowledge in both 2D and 3D, - what increases their art skills.

The success of educational innovation at university, concerning the web-classroom application, lies in teachers sharpness to define guidelines, and to present the subject according to the objectives students must reach.

The need to transform university learning into a more dynamic activity, –based on digital technologies–, as well as to motivate students towards knowledge training, will require the definition of a methodology based on the application guidelines to provide a proper use of the emerging technologies of education.